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Abstract

EXPERIMENTAL EQUIPMENT ASSOCIATED WITH THE U.K. HIGH-FLUX RESEARCH REACTORS

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DIDO, PLUTO and DMTR are general purpose high-flux research reactors, which have been in operation for many years and which are now intensively used. The diversified use of these reactors has led to a wide variety of designs of experimental equipment and the most interesting and important of these have been chosen for discussion.

A substantial part of the irradiation programme has been concerned with the behaviour of non-fissile specimens in high fast neutron fluxes. The evolution of rigs for this type of experiment is described. The original design was for irradiating graphite samples at a few hundred degrees Centigrade, while later rigs now accommodate a wide variety of materials at temperatures up to 1500°C.

A rig for fissile specimens which has similarly undergone several stages of development is also described.

The high-pressure water loop in DIDO has been working satisfactorily for several years. The principal features of the loop are outlined and modifications to allow up to four individual experimental holes to be cooled by parallel water currents from the one high-pressure water system are discussed.

The High-Temperature Gas-Cooled Loop, which is installed in PLUTO has been used exclusively by the O.E.C.D. DRAGON Project. The design concept of this loop, together with some commissioning problems and operational experience using possible DRAGON Reactor fuel elements is recounted.

Quite different problems have arisen in the provision of rigs for producing 'cold' (15 - 45°K) and 'hot' ($\sim$1100°K) neutron beams. These are discussed together with the operation of the liquid-hydrogen moderator chamber in DIDO.

Finally, the future requirements for rigs, especially with regard to temperature, are discussed and some of the proposals for meeting them described.